IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Before the Board of Patent Appeals and Interferences

In re the Application

Inventor	:	**Mark T. Johnson, et al.**
Application No.	:	**10/569,173**
Filed	:	**February 22, 2006**
For	:	**METHOD FOR CONTROLLING PIXEL BRIGHTNESS IN A DISPLAY DEVICE**

APPEAL BRIEF

On Appeal from Group Art Unit 2629

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I. REAL PARTY IN INTEREST

The real party in interest is the assignee of the present application, U.S. Philips Corporation, and not the party named in the above caption.

II. RELATED APPEALS AND INTERFERENCES

With regard to identifying by number and filing date all other appeals or interferences known to Appellant that will directly effect or be directly affected by or have a bearing on the Board's decision in this matter, Appellant is not aware of any such appeals or interferences.

III. STATUS OF CLAIMS

Claims 1-13 have been presented for examination. All of these claims are pending, stand finally rejected, and form the subject matter of the present appeal.

IV. STATUS OF AMENDMENTS

In response to the Final Office Action, having a mailing date of May 21, 2010, Appellant timely submitted arguments to overcome the reasons for rejecting the claims. No amendments were made to the claims. In reply to the Appellant's Response to the Final Office Action, an Advisory Action, having a mailing date of July 27, 2010, was entered into the record. The Advisory Action provided further rationale for maintaining the rejection of the claims in reply to the Appellant's arguments. The Advisory Action further stated that for purposes of Appeal the amendments to the claims would be entered. A copy of the claims, as currently of record, is presented herein.

A Notice of Appeal was timely filed in response to the Advisory Action and this Appeal Brief is being timely filed, with appropriate fee, within the period of response from the date of the Notice of Appeal.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention is expressed primarily in independent claims 1 and 12 which represent an active matrix display device (claim 1) and an electronic device including an active matrix display, respectively.

Independent claim 1 recites an active matrix display device (6, figure 4, page 8, lines 4-5) comprising, a display (2, figure 4, page 8, lines 5-6) with a plurality of display pixels (3, figure 4, page 8, lines 10-11); a data input (10, figure 4) for receiving a data signal; a controller (7, figure 4, lines 10-16) for distributing said data signal over said display pixels (3) to generate an image on said display (2) with an overall brightness value for each display pixel (3) during at least one frame period (F, figure 2), wherein said device (6) is adapted to divide said frame period (F) for at least one subset (S) of said display pixels (3) such that said display pixels (3) of said at least one subset (S) have at least a light output (L) at a first non-zero brightness level (L1) during a first sub-period (F1, figure 2, page 6, lines 1-2) of said frame period (F) and at a second non-zero brightness level (L2) during a second sub-period (F2, figure 2, page 6, lines 2-3) of said frame period (F), wherein the first and second levels of brightness and associated sub-periods are selected so that the time averaged sum of said brightness levels (L1,L2) of said pixels within said at least one subset (S) is substantially equal to said overall brightness level of said image (page 6, lines 3-5), said second level being maintained a stable level during the second sub period and the first and second levels being in a known ratio (page 6, lines 15-18).

Independent claim 12 recites an electronic device (1, figure 1, page 5, line 18) comprising an active matrix display device (6, figure 4, page 8, lines 4-5) comprising, a display (2, figure 4, page 8, lines 5-6) with a plurality of display pixels (3, figure 4, lines 10-11); a data input (10, figure 4, line 10) for receiving a data signal; a controller (7, figure 4, lines 10-16) for distributing said data signal over said display pixels (3) to generate an image on said display (2) with an overall brightness value for each display pixel (3) during at least one frame period (F, figure 2), wherein said device (6) is adapted to divide said frame period (F) for at least one subset (S) of said display pixels (3) such that said display pixels (3) of said at least one subset (S) have at least a light output (L) at a first non-zero brightness level (L1) during a first sub-period (F1, figure 2, page 6, lines 1-2) of said frame period (F) and at a second non-zero brightness level (L2) during a second sub-period (F2, figure 2, page 6, lines 2-3) of said frame period (F), wherein the first and second levels of brightness and associated sub-periods are selected so that the time averaged sum of said brightness levels (L1,L2) of said pixels within said at least one subset (S) is substantially equal to said overall brightness level of said image (page 6, lines 3-5), wherein said second level being maintained a stable level during the second sub period and the first and second brightness levels being in a known ratio (page 6, lines 15-18).

The remaining claims, which depend from respective independent claims, express further aspects of the invention.

VI. GROUNDS FOR REJECTION TO BE REVIEWED ON APPEAL

The issue in the present matter is whether:

(1) Claims 1-5, 7, 9 and 11-13 stand rejected under 35 USC §102(b) as being anticipated by Aoki (USPPA 2002/0003520);

(2) Claims 6 and 8 stand rejected under 35 USC §103(a) as being unpatentable over Aoki in view of Koyama (USP no. 6,828,950); and

(3) Claim 10 stands rejected under 35 USC §103(a) as being unpatentable over Aoki.

VII. ARGUMENT

I. Rejection of claims 1-5, 7, 9 and 11-13 under 35 USC §102

The rejection of claims 1-5, 7, 9 and 11-13 as being anticipated and lacking novelty under 35 USC §102(b) in view of Aoki is in error as Aoki fails to disclose a material element recited in independent claims 1 and 12 and, consequently, the claims dependent therefrom.

Summary of the Rejection of the Claims

The Final Office Action asserts "Aoki discloses an active matrix display device (para. 36) comprising a display … (para. 37), a data input … (converter 41, para. 47), a controller … (fig. 6, controller 50 para. 48), wherein said device is adapted to divide said frame period … (figs. 6 and 8, frame period divided into antecedent and subsequent sub-frames … para 50-51) such that said display pixels … have … at light output at a first …

brightness level …(fig. 9,… para. 54-55) and at a second brightness level … (fig. 9, … see para 55-57), wherein the first and second levels of brightness … are selected so that the time averaged sum of said brightness levels of said pixels … is substantially equal to said overall brightness level …(fig. 9, para. 58-60) said second level being maintained at stable level (para. 55-57) and the first and second levels being in a known ratio (para 55-57,…)."

Independent claim 12 is rejection under the same rationale as that of claim 1.

In reply to the Appellant's remarks regarding the teachings of Aoki submitted in Appellant's Response to Final Office Action, the Advisory Action further states "Examiner disagrees [with the Applicant's argument that the selected sub-frames and brightness levels of Aoki fail to provide for a brightness level that is 'substantially equal to said overall brightness level of said image'] and Applicant's attention is drawn to claim 1, line 4-6, wherein it is recited 'a controller for distributing said at signal over said display pixels to generate an image on said display with an overall brightness value for each display pixel during at least one frame period.' As is cited in para. 48, Aoki discloses a control device 50 which distributes signals Sc1 and Sc2 to the signal line driver 5. The time averaged sum of the brightness levels of these two signals (Sc1 and Sc2) is in fact equal to the overall brightness level of the image displayed. Examiner agrees that, as is shown in para. 60 of Aoki, this brightness level is greater than that of the conventional pseudo impulse method. In other words, examiner agrees that in general the time averaged sum of the brightness levels of Sc1 and Sc2 will be greater than the brightness level of the initial data signal Sc (see para. 48). However, as is currently

claimed, no distinction is made between an initial overall brightness level (e.g., the brightness level of Sc) and a final overall brightness level (e.g., the time average sum of Sc1 and Sc2)..."

Difference between the Claimed Invention Recited in the Independent Claims and the Cited References

The instant invention, as recited in claim 1, for example, which is typical of the remaining independent claims, recites

1. Active matrix display device (6) comprising:

a display (2) with a plurality of display pixels (3);

a data input (10) for receiving a data signal;

a controller (7) for distributing said data signal over said display pixels (3) to **generate an image on said display (2) with *an* overall brightness value** for each display pixel (3) during at least one frame period (F),

wherein said device (6) is adapted to divide said frame period (F) for at least one subset (S) of said display pixels (3) such that said display pixels (3) of said at least one subset (S) have at least a light output (L) at a first non-zero brightness level (L1) during a first sub-period (F1) of said frame period (F) and at a second non-zero brightness level (L2) during a second sub-period (F2) of said frame period (F), wherein the first and second levels of brightness and associated sub-periods are selected **so that the time averaged sum of said brightness levels (L1,L2) of said pixels within said at least one subset (S) is substantially equal to *said* overall brightness level of said image**, said second level being maintained a stable level during the second sub period and the first and second levels being in a known ratio. (emphasis added).

Aoki teaches "a hold type display device which holds a brightness of the antecedent picture until the subsequent signal is inputted to a pixel, wherein a frame displaying one picture is time divided into multiple sub-frames and the brightness of the subsequent sub-frame is attenuated at a designated ratio according to the brightness of the inputted picture. The thus-obtained display device prevents a moving picture from being unclear and blurred and controls the lowering of the brightness in of the picture." (see page 2-3 of the instant application, which provides this characterization of Aoki).

Aoki further teaches two sub-frames with fixed brightness intensity ratio and with fixed time periods. With reference to paragraph 44, Aoki discloses the selection of the sub-frame periods as being based on the drive frequencies of the display device ("... each one frame (a term for displaying a picture) from the point of the antecedent picture signal being inputted to the point of the subsequent picture signal being inputted is 1/60 seconds. Since one frame is time-dived into two sub-frames, each one frame means to be 1/120 seconds.)

Furthermore, Aoki discloses that the brightness level in the second sub-frame is fixed (see para. 58, "... the brightness of the subsequent sub-frame is consistently one-fourth of that the antecedent frame."). Aoki further discloses that the attenuation factor used to set the brightness level of the second sub-frame may be set as a function of the brightness level. See para. 61 "...the attenuation coefficient is fixed to 4. However, the attenuation coefficient F can be varied {F=f(Sc)} which varies according to the brightness (Sc)."

Thus, in accordance with the teachings of Aoki (as expressed in the first embodiment, for example,) there are two frames of the same size and the brightness level of the second sub-frame is a fixed (e.g., ¼) percentage of the brightness level of the first sub-frame.

However, in establishing equal sized sub-frames and a brightness level of the second frame being a function of the brightness level of the antecedent sub-frame, **Aoki teaches that the pixel brightness is increased.** (see para. 0059, "Comparing brightness ∑ of one frame ,,, with that of the pseudo impulse method, since ∑ is calculated as below, wherein brightness of the antecedent frame is C and the attenuation coefficient is F

∑ = (C+C/F)C."

And para. 0060 "assuming that C=1 and F=4, then ∑ =1.25. That is to say, brightness of one frame of the first embodiment is higher than the conventional pseudo impulse method by 25%. "

Hence, in establishing the sub-frame size and/or the brightness level (i.e., the attenuation coefficient F) of the second sub-frame, Aoki fails to provide any teaching regarding the claim elements "wherein the first and second levels of brightness and associated sub-periods are selected so that the time averaged sum of said brightness levels (L1,L2) of said pixels within said at least one subset (S) is substantially equal to said overall brightness level of said image." (emphasis added).

Rather, Aoki teaches that the sub-frames equal (i.e., in a ratio of 1:1), and the attenuation factor is selected based on the overall brightness of the antecedent sub-frame.

The combination of the brightness levels of the two sub-frames increases the overall brightness level.

Thus, the selected, or determined, sub-frames and brightness levels of Aoki fail to provide for "a display with **an overall brightness level**" and a brightness level that is "**substantially equal to said overall brightness level** of said image," as is recited in the claims. Instead the brightness level of Aoki using the two sub-frames is greater than an overall brightness level of the pixels using a single frame.

In the Advisory Action, the Examiner states that in para. 48, Aoki discloses that "the time average sum of the brightness levels of these two signals (Sc1 and Sc2) is in fact equal to the overall brightness level of the image displayed" and that the "the time averaged sum of the brightness levels of Sc1 and Sc2 with [sic] be greater than the brightness level of the initial data signal (Sc). However, as is claimed, no distinction is made between an ***initial*** overall brightness level … and a ***final*** overall brightness level…"(emphasis in the original).

However, Appellant disagrees that as claimed there is no distinction between an initial and final brightness level (to use the terms recited in the Advisory Action) as the claims refer to the "final" brightness level (said overall brightness level) being substantially equal to the "initial" brightness level ("an overall brightness less")..

Claim 1, for example, refers to the display of pixels with **an overall brightness level** (claim 1, lines 5-6) (i.e., an initial brightness level) and first and second levels of brightness selected so that the time averaged sum of the brightness levels (i.e., a final

brightness level) is **substantially equal to said overall brightness level** (lines 12-15) (emphasis added).

Hence, the claims provide for a clear recitation of the claimed "final" brightness level being substantially equal to the claimed "initial" brightness level.

Aoki fails to disclose that the initial and final brightness levels are substantially equal as Aoki explicitly teaches, and the Examiner acknowledges, that the final brightness level is greater than the initial level (see para. 0060, where C is the brightness of the antecedent sub frame and brightness of the subsequent sub frame is a fraction of C).

Anticipation requires the presence, in a single prior art reference disclosure, of each and every element of the claimed invention, *arranged as in the claim. Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 221 USPQ 481, 485 (Fed. Cir. 1984) (emphasis added).

Aoki cannot be said to anticipate the subject matter recited in independent claims 1 and 12 as Aoki fails to disclose the claim elements "generate an image on said display (2) with an overall brightness value for each display pixel (3)" in combination with the claim element "the time averaged sum of said brightness levels (L1, L2) of said pixels within said at least one subset (S) is substantially equal to said overall brightness level of said image…"

For at least the above reasons, Appellant respectfully submits that a case of anticipation has not been set forth.

With regard to the remaining claims, these claims depend from the independent claims and Appellant respectfully submits that these claims are also not anticipated at least for their dependence upon an allowable base claim, without contemplating the merits of the rejection of the dependent claims for reasons held in *In re Fine,* (citation omitted) (if an independent claim is non-obvious under 35 U.S.C. §103(a), then any claim depending therefrom is non-obvious).

In view of the above, Appellant submits that the independent claims and the claims dependent therefrom are patently distinguishable and not rendered obvious over the teaching of the cited references.

II. Rejection of claims 6, 8 and 10 under 35 USC §103

With regard to the rejection of claims 6, 8 and 10, these claims depend from the independent claims and Appellant respectfully submits that these claims are also not rendered unpatentable at least for their dependence upon an allowable base claim, without contemplating the merits of the rejection of the dependent claims for reasons held in *In re Fine,* (citation omitted) (if an independent claim is non-obvious under 35 U.S.C. §103(a), then any claim depending therefrom is non-obvious).

VIII. CONCLUSION

In view of the above analysis, it is respectfully submitted that the referenced teachings, whether taken individually or in combination, fail to render obvious the subject matter of any of the present claims. Therefore, reversal of all outstanding grounds of rejection is respectfully solicited.

Respectfully submitted,

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Date: October 14, 2010

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IX. CLAIMS APPENDIX

1. Active matrix display device (6) comprising:

a display (2) with a plurality of display pixels (3);

a data input (10) for receiving a data signal;

a controller (7) for distributing said data signal over said display pixels (3) to generate an image on said display (2) with an overall brightness value for each display pixel (3) during at least one frame period (F),

wherein said device (6) is adapted to divide said frame period (F) for at least one subset (S) of said display pixels (3) such that said display pixels (3) of said at least one subset (S) have at least a light output (L) at a first non-zero brightness level (L1) during a first sub-period (F1) of said frame period (F) and at a second non-zero brightness level (L2) during a second sub-period (F2) of said frame period (F), wherein the first and second levels of brightness and associated sub-periods are selected so that the time averaged sum of said brightness levels (L1,L2) of said pixels within said at least one subset (S) is substantially equal to said overall brightness level of said image, said second level being maintained a stable level during the second sub period and the first and second levels being in a known ratio.

2. Active matrix display device (6) according to claim 1, wherein said display (2) is a colour display and said subset (S) is defined by colour (R,G,B).

3. Active matrix display device (6) according to claim 1, wherein said device (6) is adapted to determine one or more particular areas (A) of said display and said subset is defined by said areas.

4. Active matrix display device (6) according to claim 1, wherein said device (6) is adapted to determine the total time during which said display pixels (3) have had a light output and said subset (S) is defined by said total time.

5. Active matrix display device (6) according to claim 1, wherein said first brightness level (L1) exceeds said second brightness level (L2).

6. Active matrix display device (6) according to claim 1, wherein said first sub-period (F1) has a shorter duration than said second sub-period (F2).

7. Active matrix display device (6) according to claim 1, wherein said device (6) is adapted to supply a select signal (18) for selecting said display pixels (3) of said subset (S), said select signal (18) comprising at least a first select signal (18') triggering said first sub-period (F1) and a second select signal (18") triggering said second sub-period (F2).

8. Active matrix display device (6) according to claim 1, wherein said display pixels (3) comprise current emissive elements (14) driven by drive elements (T2) and

said device (6) is adapted to vary a voltage (13;15) for said drive elements (T2) such that said at least one subset (S) of current emissive elements (14) is driven to at least said first brightness level (L1) during said first sub-period (F1) and said second brightness level (L2) during said second sub-period (F2).

9. Active matrix display device (6) according to claim 1, wherein said display (2) is an active matrix liquid crystal display, said device (6) comprising a backlight (20) and being adapted to control said backlight (20) such that said light output (L) of said display pixels (3) of said at least one subset (S) yields said first brightness level (L1) during said first sub-period (F1) and said second brightness level (L2) during said second sub-period (F2).

10. Active matrix display device (6) according to claim 9, wherein said display (2) is a colour display and said backlight (20) is a LED-backlight or a colour sequential backlight.

11. Active matrix display device (6) according to claim 1, wherein said device (6) is adapted to generate said light output (L) such that said second brightness level (L2) has a brightness that is 30% or less than said first brightness level (L1).

12. Electronic device (1) comprising an active matrix display device (6) comprising:

a display (2) with a plurality of display pixels (3);

a data input (10) for receiving a data signal;

a controller (7) for distributing said data signal over said display pixels (3) to generate an image on said display (2) with an overall brightness value for each display pixel (3) during at least one frame period (F),

wherein said device (6) is adapted to divide said frame period (F) for at least one subset (S) of said display pixels (3) such that said display pixels (3) of said at least one subset (S) have at least a light output (L) at a first non-zero brightness level (L1) during a first sub-period (F1) of said frame period (F) and at a second non-zero brightness level (L2) during a second sub-period (F2) of said frame period (F), wherein the first and second levels of brightness and associated sub-periods are selected so that the time averaged sum of said brightness levels (L1,L2) of said pixels within said at least one subset (S) is substantially equal to said overall brightness level of said image wherein said second level being maintained a stable level during the second sub period and the first and second brightness levels being in a known ratio.

13. The Active matrix display device of claim 1 wherein the first and second sub-periods are adjacent in time.

X. EVIDENCE APPENDIX

No further evidence is submitted herein.

XI. RELATED PROCEEDING APPENDIX

No related proceedings are pending and, hence, no information regarding same is available